Mashing Process

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1894

Hot air thru wort

1895

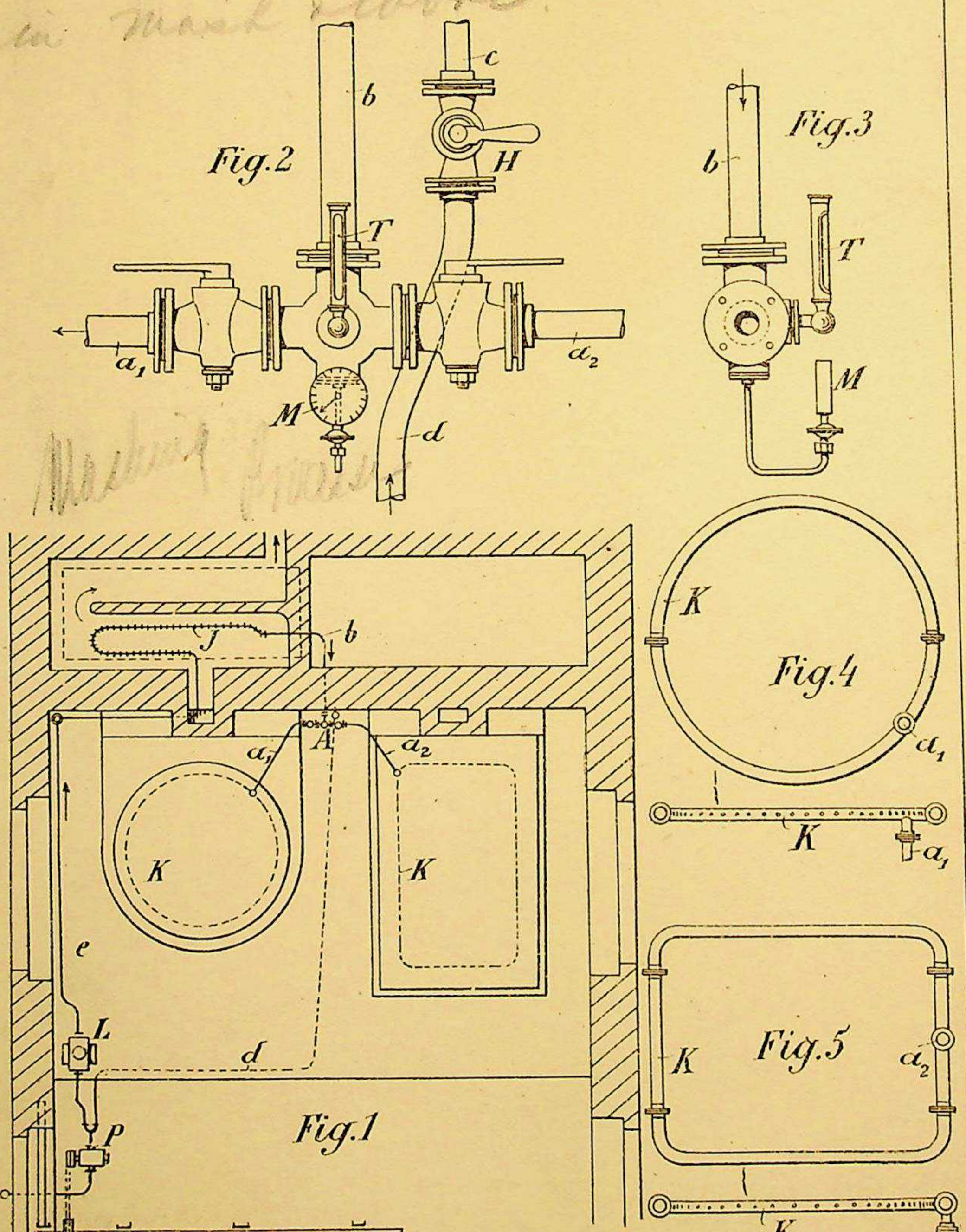
A.D. 1894. Aug. 3. Nº 14,918.

PROCHAZKA'S Complete Specification.

(1 SHEET)

Apparatus for Rendering Flaky the Albumenoids in Mash & Wort.

Mashing Process



[This Drawing is a reproduction of the Original on a reduced scale.]

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Ale 50 1895
Mashing Process (1)

RECORDED

N° 14,918 A.D. 1894

Date of Application, 3rd Aug., 1894
Complete Specification Left, 11th Feb. 1895—Accepted, 23rd Mar., 1895

PROVISIONAL SPECIFICATION.

An Improved Process and Apparatus for Rendering Soluble the Albumenoids in Mash and Wort.

I, Ladislaus Prochazka, Brewer of 706 Jablouski Gasse in the City of Prague, Austro-Hungarian Empire, do hereby declare the nature of this invention to be as follows:—

It has not been possible heretofore in every case to effect coagulation of the proteine, which in the wort is being subjected to an injurious decomposition and which passes into the wort in this state.

Where barley rich in gluten is malted, gluten is produced when treating the proteine at temperatures near the brewing heat and above, which gluten enters the wort in a dissolved state, but when the beer cools down it settles, which causes clouding of the beer.

The object of this present invention is to remove this clouding by bringing the proteine (gluten) to a soluble state, in which it will not settle even when cold.

The yield of extraction will thus be increased. According to my new process the mash and wort are aerated during the first boiling by injecting hot air free of germs and impurities at a temperature of about 125° C.

Through this aerating with hot air I obtain the result that no proteine is lost, on the contrary it remains in a soluble state in the wort, without acting detrimentally or causing clouding.

To carry on this process I use an apparatus heated by the waste heat of the mash pan in the flues, in which it is placed. The air is forced through this heating apparatus by a fan or otherwise and after being heated enters through perforated pipes placed in the bottom of the mash pan and the brewing pan into the mash and wort.

The temperature of the air when leaving the pipes can be regulated by the degree of swiftness with which the air passes through the heating apparatus, or in some other suitable manner.

Dated this 2nd day of August 1894.

S. S. BROMHEAD,
97, Newgate Street, London, E.C., Agent for Applicant.

COMPLETE SPECIFICATION.

An Improved Process and Apparatus for Rendering Soluble the Albumenoids in Mash and Wort.

I, Ladislaus Prochazka, Master Brewer in Turnau, Kingdom of Bohemia, Austro-Hungarian Empire, formerly of 706 Jablouski Gasse, City of Prague, in the Austro-Hungarian Empire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

A constant effort on the part of the brewer of beer has always been, to

[*Price 8d.*]

incorporate in the beer the nitrogenous constituents albumenoids as far as may be done, seeing that according to the universal experience of brewing operations, more than the half of these nutritive substances of the malt remain in the spent grains.

The aeration of the wort in a warm condition, intended to hinder the albumenoids from setting up any injurious action, and rather to bring about their coagulation, fulfilled that purpose but imperfectly, because though, by this operation certain nitrogenous substances pass over in solution into the wort, they do not remain permanently in solution, but are precipitated in a solid form either as the wort cools, or in a later stage, in the beer, and cause detrimental turbidity and thickness therein without adding to the nutritious qualities of the beer itself.

All aeration-processes, carried on at temperatures approaching to brewing heat —and this only is what has been sought—are unsuitable for brewery purposes by reason of subsequent troubles with the gluten.

Now the object of the present invention is a process for converting the albumenoids in mash and wort into soluble modifications, which will subsequently remain so, in the mash and wort as well as later on in the beer, so as to materially improve its quality, while in the residue of spent grains there are much less of these nutritious substances than occur in the case of any other process of brewing hitherto employed.

My process essentially consists in blowing hot sterilized and germ-free air of the temperature of 125° Centigrade into the mash and wort during the brewing. By blowing in air of 125° C.—no lower temperature will have the desired effect—a large part of the albumenoids is oxidised and undergoes a chemical change.

Numerous attempts and investigation have shown, that by the momentary contact of the hot stream of air at 125° C. with single particles of the wort, the hydrocarbons in the latter will not only not be unfavourably influenced thereby, but converted into amides and peptones, which naturally remain permanently in solution as such ; and care is therefore taken that by an exact regulation of the volume, and the utmost possible subdivision of the hot air conducted to it, the greatest possible quantity of wort is successively brought, in ever fresh portions and for a short time in contact with the current of hot air and momentarily heated to 125° C., whereby the greater part of all the albumenoids are successively changed into amides and peptones.

Through the ever-present circulation of the wort, by which fresh portions thereof are continually brought into contact with the hot-air-current, we ultimately attain to the desired effect in the product of the entire mash.

Thus ; by this process, not only is the powerful fermentation of the wort very materially influenced and favoured, but at the same time the extracted yield of the nutritious properties of the malt is considerably increased, and, in the result, the foaminess and creaminess, and ripeness and flavour of the finished beer may indisputably be ascribed to the presence of the altered albumen products (amides and peptones) remaining in solution.

For the practical carrying out of the process as above described I use the apparatus represented in the accompanying drawings, which is designed to measure and if requisite to regulate according to requirement, in quantity, temperature and pressure the air employed and applied in the aeration.

Figure 1 shows the general arrangement of the apparatus, as seen in plan ; while

Figures 2 and 3 show, on a larger scale, two elevations of the detail A, in Figure 1 ; and

Figures 4 and 5 show, in plan and side elevation, the finely perforated distribution pipes K.

The apparatus is essentially composed of the following parts :—

From the main driving shaft S of the brewery is driven a blowing engine P of which the capacity is known. The air delivered by this blower attains the conducting pipe *e*, after passing through a gas or air meter L so that the exact quantity of air passing through may be known and, if needful, regulated, by means of the regulating cock H (Figure 2) fixed at A (Figure 1), with which the blower is connected by a branch-pipe *d*, forking off prior to the passage through L. It must be noted that care is to be taken that the cock H shall in all cases remain slightly open, so that at all times a small quantity of air escapes into the open, through the pipe *c*, inasmuch as, in that case, the regulation of the volume as well as of the pressure and temperature is more easily attained than were the cock quite closed; because it might frequently be necessary to permit the inflow of more air into the mash, which, otherwise, could only be effected by a more rapid revolution of the blower. On the other hand, however, if the cock is always slightly open, it will be possible at any time, by a small closure-turn of the regulating cock, to obtain the desired excess-supply, without the necessity of accelerating the speed of the blower.

The communicating-pipe *e* from the meter, passes forward into the flues of the pan-heaters, where is inserted a ribbed heater or gilled pipe J, in which the air is duly heated. The air so heated is conveyed by the pipe *b* to the point A whence are led off the two branch-pipes a^1 a^2, so that the hot air-current may be delivered, as needed, into the two finely perforated distribution-pipes K (Figures 4 and 5) arranged inside the brewing-pan or wort copper and the mash-pan, so that it may flow out and come into intimate contact with either the mash or the wort.

Attached to the pipe *b* is a manometer or pressure-gauge M and a thermometer T.

Inasmuch as the temperature of the air used for aeration is of the utmost importance, the chief point of attention of this process is always to keep the eye on the thermometer, so as to notice the least variation and remedy it at once. This can be done by means of the beforenamed regulating cock, which is to be so manipulated that, as soon as the first signs of a temperature-depression set in, by suitably turning the cock, more air is allowed to escape into the open, and consequently less air attains the ribbed-heater, and this smaller quantity is heated more rapidly and to a higher extent. And so *vice versa* when the temperature of the air-current is too high.

As, in consequence of this opening and closing of the cock, H, different quantities of a fixed temperature air are admitted either to the mash or to the wort, and as it is obviously advantageous that the quantities of the mash or wort brought into co-operation therewith should be equal and alike, the irregularities of the quantity of air used for aeration will naturally be neutralized and made of no account by the varying of the duration of its action; inasmuch as, with a greater pressure evidenced at the gauge (or a greater quantity in the meter) the duration of the aeration must be shorter, and, in the contrary case, longer.

But this time, however, will always be adjusted in accordance with the indication of the air-meter.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A process for rendering soluble the albumenoids present in (beer) mash and wort consisting in blowing a hot air-current at a temperature not lower than 125° Centigrade in a finely divided state in to and through the mash and wort so that the greatest possible number of particles of the mash and wort are oxidated thereby and converted into soluble compounds (amides and peptones) which remain soluble and wherein the duration of the air-treatment is regulated according to the quantity of hot air passed into the mash and wort.

2. In the process made known in Claim 1 the employment in combination with the pans or with a pan or a boiler in a brew house of a system including an accurate and reliable blowing engine such as P an air-meter such as L and a heater such

as J the latter located in the flues of the pan-heating furnace and a regulating cock such as H whereby as may be necessary according to the temperature indicated by the thermometer T more or less air is permitted to escape into the open substantially as and for the purposes described.

Dated this 8th day of February 1895.

BOULT & WADE,
Agents for the Applicant.

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